

3 a first articulate arm which has a passive joint that is coupled to a first end
4 effector inserted into the incision, wherein the incision defines a first pivot point for said first
5 end effector;

6 a first input device that creates a first input command in response to an
7 instruction from the surgeon; and,

8 a controller that is coupled to said first input device and said first articulate arm,
9 said controller receives said first input command from said first input device and provides a
10 first output command to said first articulate arm to move said first end effector relative to the
11 first pivot point.

Sub 1
2 107. The system as recited in claim 106, further comprising a second
3 articulate arm which has a second end effector, and a second input device which creates a
4 second input command in response to an instruction from the surgeon, said controller receives
5 said second input command from said second input device and provides a second output
6 command to said second articulate arm to move said second end effector about a second pivot
point located at a second incision of the patient.

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1 108. The system as recited in claim 107, further comprising a third articulate
2 arm that holds an endoscope, and a third input device which receives an instruction from the
3 surgeon and which generates a third input command in response to the instruction, said
4 controller receives said third input command and provides a third output command to said third
5 articulate arm to move the endoscope about a third pivot point located at a third incision of the
6 patient.

1 109. The system as recited in claim 108, wherein said first input device is a
2 master handle that is moved by the surgeon.

1 110. The system as recited in claim 109, wherein said first end effector
2 moves a scaled increment of a movement of said master handle.

Sub 2
1 111. The system as recited in claim 106, wherein said first end effector has a
2 force sensor and said first input device has an actuator that is coupled to said force sensor to

3 apply a force to the surgeon that corresponds to a force sensed by said force sensor.
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5 112. The system as recited in claim 111, wherein the force applied to the
6 surgeon is a scaled increment of the force sensed by said force sensor.

7 113. A medical robotic system that can be controlled by a surgeon for use
8 with a patient comprising:

1 a first articulate arm with a first end effector;

2 a first input device that creates a first input command in response to an
3 instruction from the surgeon; and,
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5 a computer that is coupled to said first input device and said first articulate arm,
6 said computer receives said first input command from said first input device and provides a
7 first output command to said first articulate arm to move said first end effector.
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1 114. The system as recited in claim 113, wherein the instruction from the
2 surgeon comprises a movement in a desired direction relative to an object displayed to the
3 surgeon on a display device, and wherein the first output command moves the end effector in
4 the desired direction relative to the object by pivoting a shaft coupling the end effector to the
5 arm about an incision.--